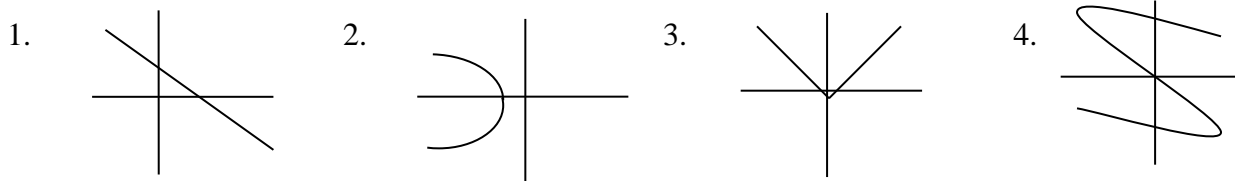


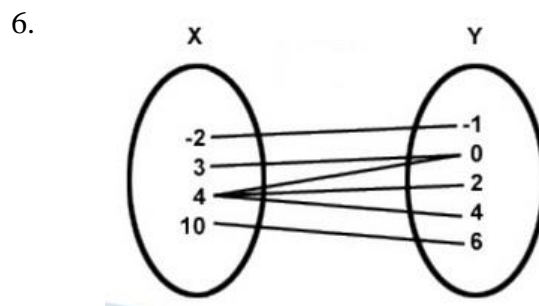
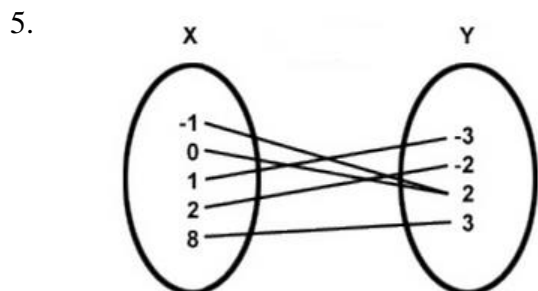
3.1 Functions

Name _____ Date _____ Period _____

Use the vertical line test to determine whether the curve is the graph of a function.



Determine whether each relation represents a function. For each function, state the domain and range.



7. $\{(2, 6), (-3, 6), (4, 9), (2, 10)\}$

8. $\{(-2, 4), (-2, 6), (0, 3), (3, 7)\}$

Determine whether the equation defines y as a function of x .

9. $y^2 = 4 - x^2$

10. $y = \frac{1}{x}$

11. $x = y^2$

12. $y = 2x^2 - 3x + 4$

13. $y = \frac{3x-1}{x+2}$

14. $x^2 - 4y^2 = 1$

Find the following for each function.

15. $f(x) = 3x^2 + 2x - 4$

(a) $f(0)$

(b) $f(1)$

(c) $f(-1)$

(d) $f(-x)$

(e) $-f(x)$

(f) $f(x+1)$

(g) $f(2x)$

(h) $f(x+h)$

16. $f(x) = \frac{x}{x^2 + 1}$

(a) $f(0)$

(b) $f(1)$

(c) $f(-1)$

(d) $f(-x)$

(e) $-f(x)$

(f) $f(x+1)$

(g) $f(2x)$

(h) $f(x+h)$

Find the domain of the function algebraically. Write your answer in interval notation. Show work!

17. $f(x) = -5x + 4$

18. $f(x) = \frac{x}{x^2 + 1}$

19. $g(x) = \frac{x}{x^2 - 16}$

20. $F(x) = \frac{x-2}{x^3 + x}$

$$21. \quad h(x) = \sqrt{3x-12}$$

$$22. \quad f(x) = \frac{4}{\sqrt{x-9}}$$

$$23. \quad f(x) = \sqrt{4x+3} + 2$$

$$24. \quad f(x) = \frac{\sqrt{x-5}}{(x+2)(x^2+4)}$$

For the given functions f and g , find the following. For parts $a - d$, also find the domain.

$$25. \quad f(x) = x-1; \quad g(x) = 2x^2$$

$$(a) \quad (f+g)(x)$$

$$(b) \quad (f-g)(x)$$

$$(c) \quad (f \bullet g)(x)$$

$$(d) \quad \left(\frac{f}{g}\right)(x)$$

$$(e) \quad (f+g)(3)$$

$$(f) \quad (f-g)(4)$$

$$(g) \quad (f \bullet g)(2)$$

$$(h) \quad \left(\frac{f}{g}\right)(1)$$

$$26. \quad f(x) = 1 + \frac{1}{x}; \quad g(x) = \frac{1}{x}$$

$$(a) \quad (f+g)(x)$$

$$(b) \quad (f-g)(x)$$

$$(c) \quad (f \bullet g)(x)$$

$$(d) \quad \left(\frac{f}{g}\right)(x)$$

$$(e) \quad (f+g)(3)$$

$$(f) \quad (f-g)(4)$$

$$(g) \quad (f \bullet g)(2)$$

$$(h) \quad \left(\frac{f}{g} \right)(1)$$

Review

Factor

$$27. \quad -x^2 + 2x + 8$$

$$28. \quad 75x^2 - 363y^6$$

$$29. \quad 12x^2 + 25x - 7$$

$$30. \quad x^4 - 16$$

Simplify each expression.

$$31. \quad \frac{15x^2 + 5x - 50}{32x^2 - 18} \div \frac{x^2 - 5x - 14}{4x^2 + 9x - 9} \cdot \frac{6x - 42}{3x^2 + 4x - 15}$$

$$32. \quad \frac{4}{x+3} - \frac{10}{x-3} + \frac{x+2}{x^2-9}$$